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ABSTRACT

This paper proposes a Virtual Teacher Training Center (VTTC) as an effective and efficient short-term solution that can become an integral part of a long-term solution to a crisis in career and technical education (CTE) teacher availability. An introduction discusses the challenge and describes the VTTC's two major foundations, which are the following: (1) a flexible, dynamic re-configurable teacher education program of 27-33 credits that can be completed within 1 academic year and is designed to train persons with industry and field experience into educated and licensed CTE teachers; and (2) Internet technology to deliver the program to potential teachers in their homes and communities, while they continue engaging in practical experience and student teaching near their homes. A discussion addresses the functioning model at Oregon State University. For each course, detailed descriptions and content outlines are provided. Informative material reports that each course is 1 credit, representing 30-33 hours of work; includes 3-4 open-ended activities with threaded discussions; and culminates in a capstone activity, a synthesis of each student's activities in that course. Courses are grouped in these categories: students and learning (4 courses); curriculum, instruction, and assessment (4 courses); school, community, and

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professional cultures (4 courses); and improving practice (3 courses). These other components within the instructional site are outlined: extensive list of resources, tools for student self-evaluation, teacher evaluation of student, online grade book, open chatroom, and place for announcements. Suggestions for a virtual home-base site are made. (Contains 41 references.) (YLB)

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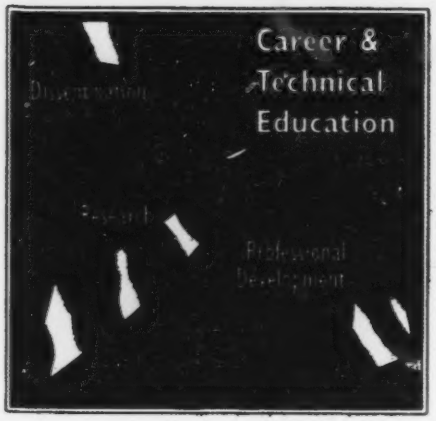

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The Virtual Teacher Training Center:

A One-Year Program to Transform Subject-Matter Experts into Licensed Career and Technical Education Teachers

Sylvia M. Twomey

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INTRODUCTION

The Challenge: A Crisis in CTE Teacher Availability

In 1998, the study *The Quality of Vocational Education: Background Papers from the 1994 National Assessment of Vocational Education (NAVE)* was published by the Office of Educational Research and Improvement, U.S. Department of Education. The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 mandated this study. It encompassed a broad-based assessment of vocational education from a wide range of sources, both published and unpublished.

Five of the NAVE background papers within the report focused on the quality of vocational education, and played a vital role in the formation of Volume II of the final report of this comprehensive study (Gamoran, 1998). These five papers focused on teachers in vocational education, and outcomes of vocational and academic schooling. Two of these five papers, both by Richard L. Lynch, particularly focused on the training of teachers in vocational education: *Vocational Teacher Education in U.S. Colleges and Universities, and its Responsiveness to the Carl D. Perkins Vocational and Applied Technology Education Act of 1990*, and *Occupational Experience as the Basis for Alternative Teacher Certification in Vocational Education*. These two papers formed the primary impetus for my proposal.

Throughout Lynch's study, an alarm was sounded regarding an approaching crisis in the availability of vocational education teachers—"enrollment in teacher training programs in vocational education is declining in virtually all fields" (Lynch, 1998). Lynch stated further that

> We are facing a burgeoning need for career and technical teachers to train potential workers, yet have fewer and fewer educators to train the teachers. Nearly 10% of colleges and universities have closed their vocational teacher education programs, and others haven't graduated a vocational education teacher in years. (Lynch, 1998).

However, the final recommendations by NAVE that resulted from Lynch's studies, as well as others, focused on "implementing higher standards for vocational education"—not on exploring ways to increase the number of vocational education teachers that were being prepared to teach.

In 1998, another study sounded a general alarm related to projected teacher shortages for education in general. This study, from the U.S. Department of Education, stated as part of Title II of the Higher Education Act, that "America's schools will need to hire 2.2 million teachers over the next 10 years" (U.S. Department of Education, 1998). Looking back, the seriousness of the impending crisis in vocational education appears to have been underplayed. Whether the shortage was due to the breadth of the study (Lynch, 1998) that covered myriad areas of vocational education, and thus blurred what was being said about vocational education, or because of the depth of the U.S. Department of Education study that covered all of education, including vocational education as only one of many, and thus the crisis was lost in the crowd, would be difficult to determine exactly.

External factors can also be cited for the inattention to the impending shortage of career and technical education (CTE) teachers: rapid changes in technology and its application to vocational fields; the diffusion of information technologies within general work skills and academic

disciplines to the extent that its existence as a separate program became indistinct; and rapid loss of educational funding nationwide, which has contributed to regular seasonal layoffs of career and technical education teachers who generally teach in subject areas considered electives, and thus are easily cut in times of economic hardship.

Also considered should be the continuing attitude that teaching is a vocational effort, and that truly vocational teachers are doubly pressed to prove their professionalism and status at 4-year institutions, where they are competing with the more academic disciplines for prestige, legitimacy, funding, and other resources (Lucas, 1999). The more recent movement toward the integration of vocational subjects with academic disciplines in the name of broadening the capabilities of potential employees for the workforce is having the effect that academic considerations are subsuming vocational considerations (Lucas, 1999; Goldstein, Navone, & Bailey, 2000).

Endemic to the training of career and technical educators are several other issues, which cannot be addressed as easily as training teachers in strictly academic areas. One of these is the fact that career and technical education teachers must have experience in the field prior to their teacher education training, rather than afterward. This means that potential students wishing to become career and technical education teachers in middle, secondary, and postsecondary schools must first get several years of workplace experience (500–4,000 hours), get a bachelor's degree in their subject-area or related subject-area, and then enter a teacher training program, which itself may take anywhere from 1 to 3 years—especially if it is a graduate-level program. This translates into an overall cost of training for a career and technical education teacher of $100,000 or more, and can consume 8 to 12 years before the career and technical education teacher can step into the classroom (Garamond, 1998).

At the same time, a powerful disincentive for potential career and technical educators to take on this protracted period of training is that potential CTE teachers can make more money working in business or industry than they can make as teachers (Lewis, 2001). Although many technically trained and experienced individuals who want to become CTE teachers are coming out of the workforce, many are finding it easier and less stressful to go back into the workplace when a seasonal layoff occurs in education. Since most career and technical subjects are electives, these seasonal layoffs are becoming more common as economic hard times hit schools in all states. Return to industry appears to be a more secure option for career and technical education teachers than waiting out the summer for a new school year, to see if a position might be available. This factor alone is draining off new and potential career and technical education teachers within the available workforce.

Finally, high schools in outlying geographic areas with only one or two classes in career and technical subjects often turn to academic-subject teachers they already employ. These teachers may have little more than anecdotal experience with career and technical education subjects, but can be easily called in to teach a computer-lab or business class (Lucas, 1999). This practice can lead to a paradoxical situation—the simultaneous appearances of shortages in jobs and teachers. Large urban areas may have problems filling their career and technical education positions, while smaller, remote farming or suburban areas have more teachers than jobs.

The 2000–2001 edition of the U.S. Department of Labor *Occupational Outlook Handbook* stated that career and technical education teaching positions would grow 10–20% by 2008. Bruening, et al. (2001), conducted a comprehensive study to see what, if anything, had changed in the intervening decade since the 1991 data reported by Lynch (1998). What was found is disheartening in light of our realization that the crisis in career and technical education is no longer impending; it is upon us. The study confirmed a decline in the capacity to produce CTE teachers that represents at least a 10% decrease over the prior 10 years (Bruening, et al., 2001).

The Bruening, et al. (2001), study also observed that "the profession is looking toward more distance education as a means to deliver education." A separate study, completed in 2001, concluded that in the decade since 1990, "the number of career and technical education teacher preparation programs has declined about 11%" (Bruening, et al.). This study reported that 44% of respondents to a CTE questionnaire intended to double their distance education course offerings via the World Wide Web within the next 3 years, yet current programs "remain very traditional in the structure and delivery of their courses" (Bruening, et al., 2001). Gearing up to offer any substantial number of courses or programs for the training of teachers on the World Wide Web will consume most, if not all, of those 3 years and, in the meantime, the shortage of CTE teachers will continue to grow.

However, in many of the reports, the conclusions agree with the 1998 NAVE report—that vocational education should be more integrated with academic education. As the NCCTE report expressed, this reinforcement of greater academic rather than vocational integration, "workplace skills need to be evaluated to determine which skills and experiences CTE educators need to have to maintain educational standards for technical competencies … these respondents seem to be in concert with the latest literature indicating strong support for themes like academic integration" (NCCTE, 2000). Depending upon the way one interprets these findings, they could be viewed as another effort to make career and technical education more academic, and less vocational.

A study completed by the Vocational Technical Council (VTC), also published in 2000, focused on establishing a process for establishing standards for vocational-technical college instructors "that was consistent with the statewide skill standards projects. … (Believing) that the only way to achieve creditable vocational certification would be to enlist the industry (community and technical colleges) in setting the standards/competencies for instructors." (Goldstein, Navone, & Bailey, 2000).

The VTC report recognized that the career and technical educator of the 21st century requires more than the skills of their profession. It identified those skills sets and also reinforced the fact that career and vocational educators must be thoroughly trained and adept in the vocational areas they are teaching:

> The traditional ways of training people seem to be falling short. Although there are many reasons for this, a large part could be the disconnect between the workplace and the training institutions; be they elementary, secondary, or college, some schools do not have their fingers on the pulse of the changing economy and world of work. (Goldstein, Navone, & Bailey, 2000).

More courses, extended degree programs, higher degrees, and more required academic subjects within career and technical teacher education programs will not produce knowledgeable subject-matter specialists anytime soon. On the other hand, no one wants to respond with a short-term solution, which may become a long-term problem. However, an effective and efficient short-term solution does exist that can also become an integral part of a long-term solution—subject-matter specialists from the work force. This paper combines new sources of potential teachers (subject-matter specialists from the work force), new ways of preparing them for the classroom (practical, experiential, reflective, and inquiry-based), and new technologies to deliver educational training for these newcomers (web-based delivery). This three-pronged solution is the Virtual Teacher Training Center.

A Solution: The Virtual Teacher Training Center

The Virtual Teacher Training Center proposed within this paper relies on two major foundations; a flexible, dynamic re-configurable teacher education program of 27–33 credits that can be completed within 1 academic year, and is designed to train persons with industry and field experience into educated and licensed CTE teachers. The second major foundation of the proposed program is the usage of Internet technology to deliver the program to potential teachers in their homes and communities, while they continue engaging in practical experience and student teaching near their homes with cooperating or master teachers.

A Virtual Teacher Training Center is a viable and effective way to transform subject-matter experts into licensed secondary-level career and technical teachers. By subject-matter experts, I mean individuals who already have at least the basic knowledge of the subject area—either through education, practical experience, or industry and professional trade licenses. What they are lacking is knowledge of teaching, management of the educational environment, and practical experience in the classroom, including student teaching. At the conclusion of such training, the new career and technical education teacher would be eligible for a license to teach in middle, secondary, or postsecondary schools. Advanced academic training is not a prerequisite, but is not precluded as a subsequent goal after the new teacher has begun a teaching career.

The solution provided by the Virtual Teacher Training Center could quickly and efficiently prepare career and technical education teachers for the classroom—in less than 1 academic year. This 1-year program is not degree-dependent and could exist alongside longer academic teacher education programs, serve as a precursor to them, or serve as a continuation of academic work. The proposed 1-year program could provide a bridge between practical experience and advanced academic training, creating an alternative path for trained and experienced workforce specialists.

Using web-delivered instruction, such a program could provide potential career and technical education teachers with academic opportunities to synthesize their work-based experience with knowledge of education and its pedagogy (see Figure 1).

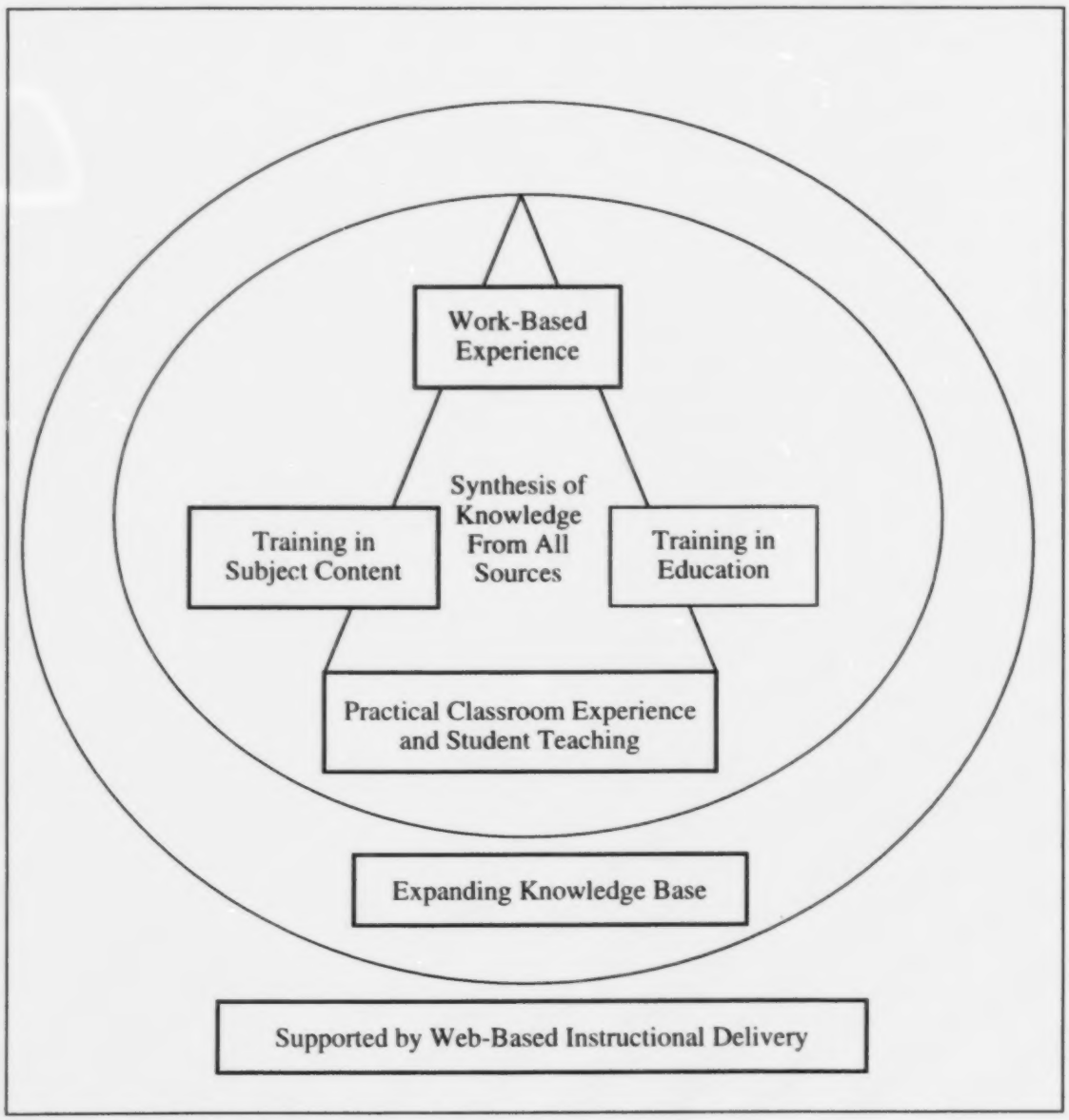
Work-Based Experience
Synthesis of Knowledge From All Sources
Training in Subject Content
Training in Education
Practical Classroom Experience and Student Teaching
Expanding Knowledge Base
Supported by Web-Based Instructional Delivery

Figure 1. Turning subject area specialists into CTE teachers.

The Virtual Teacher Training Center could also reach populations that, for reasons of economy, time, or distance have not enrolled in traditional teacher preparation programs. Such a program does not preclude more extensive academic training; it just does not make that training a prerequisite to teacher education and licensure for experienced professionals.

The proposed center falls between the two historical extremes for training teachers—school-based apprenticeship directed and supervised by classroom practitioners, and the protracted and elaborate regimen of academic instruction offered by colleges and universities that require an extended period of time to gain advanced degrees.

The Virtual Teacher Training Center can provide a training arena where career and technical teacher education and licensure are not reliant upon the usual connection to either an undergraduate or graduate degree program. Courses and experience from traditional and non-traditional sources could be applied as verification of subject-matter knowledge acquisition. Sources could be:

- 2-year community college subject matter content,
- training and experience in trades with union affiliation and instruction,
- trade schools that focus on career and technical subject training,
- workshops that function as specialized enhancement training,
- on-the-job training from industries that provide detailed training to employees,
- courses offered by industry training programs in specialist areas,
- satisfactory completion of skill sets established by skills standards for professional technical educators,
- others.

A web-based delivery system has greater capability than any brick-and-mortar classroom to reach students who would be teachers with career and technical content knowledge gained in the workplace, from vocational sources, or from a combination of academic and vocational experience. These are generally older students, often site-bound by jobs and family responsibilities, who may or may not already have academic training in their subject areas, but who do have extensive practical experience. These are people who have worked in their specialty areas long enough to have advanced beyond entry-level skills, to supervisory and managerial levels. These are also students who may be living in remote or isolated areas where (a) schools have a scarcity of career and technical teachers, and (b) where no colleges or universities are located—both necessary elements for traditional teacher training.

The following description of a Virtual Teacher Training Center contains several premises that would need to be discussed by colleges or universities or any other entity before adopting such a plan:

- potential teachers already have achieved subject-area knowledge, from whatever sources, sufficient for teaching,
- broad-based liberal education to the graduate-degree level is not required before a new teacher begins teaching (Goodlad, 1990),

- 1-year web-delivered course of teacher education, coupled with site-based practical classroom experience and student teaching can provide a beginning teacher with the experience and knowledge necessary to be effective in the classroom,
- effective supervision of the new teacher's performance can be accomplished through the combined efforts of the on-site cooperating teacher and virtual electronic supervision from the university site,
- students who would be teachers can learn and practice what they need to know via a series of courses that are inquiry-based, reflective, and delivered via a web-based program,
- performance of new career and technical teachers trained in such a manner matches the performance of teachers trained in traditional types of programs,
- programs should remain in an academic setting expanded to include licensure from community colleges,
- a series of bridges are built within the academic community that would allow opportunities for teachers who have become licensed without bachelor's degrees in their subject area to mainstream into bachelor's- or graduate-degree programs, if they choose.

DISCUSSION

Some Thoughts About Training CTE Teachers

"There is nothing remotely resembling a national consensus on the question of how best to train teachers for the classroom, even among teachers themselves" (Lucas, 1999). Positions on teacher training have evolved to two extremes: those who urge some form of school-based apprenticeship directed and supervised by classroom practitioners, and those who urge that teacher training needs to remain an elaborate regimen of academic instruction over an extended period of time. Any proposed solution to the teacher crisis will be plagued by the residual effects of our long history of separating academic training from vocational training, and the further separation of teacher training from training in specific academic subjects.

Historically, career and technical education teachers have come from the work force. Beginning in the late 19th century, throughout the United States, artisans and craftsmen were recruited to teach in vocational schools. This practice culminated in the Smith–Hughes Act of 1917. After the Second World War and the growth of "white collar," or desk, jobs, manual laborers gained the label "blue collar" because of their blue work shirts. The term blue collar became a pejorative translating into "those who work with their hands, not their minds."

In the 1950s, as demand for consumer goods increased and wages for blue collar jobs rose, training had difficulty keeping pace. At the same time, college degrees became more accessible, and "educated" status translated into "trained." Workers who had formerly been known as blue collar could escape this stigma, while legitimizing their profession by preparing for it with a college degree. Concurrently, the number of vocational schools diminished, and industrial arts programs blossomed at colleges. During the 1960s, even though many of the former blue collar programs brought in large numbers of students, the stigma of vocational roots remained. In a bid for legitimacy, college-based programs in career and technical education modified their curricula to meet the level of perceived substance and rigor of their more traditional science, math, and liberal arts programs (Lucas, 1999).

During the 1990s, industrial arts programs began to disappear, and courses considered vocational remained in high schools, but at the college level moved to the community college or disappeared all together. With the advent of the computer, robotics, performance support systems, and computer-aided design and manufacturing, the knowledge base required of former industrial arts programs became increasingly more technical. The need for training teachers for the students that were to replace workers retiring or leaving because of technical take-over of their former jobs changed drastically and became at the same time more complex (Raybould, 1995; Gery, 1991; Goldstein, Navone, & Bailey, 2000). In this past decade, the realization that teachers to train technical workers were becoming increasingly scarce became impossible to ignore.

The year 2001 is faced with the dilemma of no teachers to train the teachers—truly the beginning of an information revolution similar to the Industrial Revolution, which required the building of machines to build machines in order for the Industrial Revolution to advance. We are presently without teachers to train the teachers in career and technical subjects. Without career and technical education teachers, fewer and fewer new technical workers will be trained.

Skills Teachers Need to Teach Vocational Students

A number of surveys that included the skill sets considered necessary for teachers showed considerable agreement on the training and knowledge that every teacher needs to be successful and effective in the classroom:

- extensive field experience,
- knowledge of classroom management,
- knowledge of multicultural issues,
- theories of learning,
- methods for evaluating student learning,
- ability to apply theory to practice,
- child and adolescent growth and development,
- importance of collaboration,
- ability to work with parents and the community

Most of the above knowledge areas were present in one form or another in the surveys examined (Holste & Matthews, 1991; NBEA, 1997; NWREL, 1999; Simpson & Sandidge, 1994), as well as in the program courses examined. The skills most commonly required and discussed as most useful were: practical experience in the classroom and student teaching. In fact, academic skills were given less importance than the practical skills related to classroom experience (Lucas, 1999).

However, vocational teachers need one important skill that is different from those teachers in primarily academic subjects need—the ability to operate the machines or equipment they are teaching students to use. To do so, teachers will need to

> return constantly to a learning modality, not just back in industry but for reviewing and changing theoretical foundations for the subjects they teach in order to keep updated. This means that they will have to be able to access information in a variety of ways, including global information, process it quickly, and use it in teaching and learning situations (Goldstein, Navone, & Bailey, 2000).

This acquisition of a physical skill requires different brain activity than cognitive-skills acquisition. (Bandura, 1986; Carlson, 1997; Dede, 1996; Flavell, 1996; Fischer, 1999; Gazzaniga, 1992; Posner, 1988; Restak, 1995; Skinner, 1953). The dual requirements of staying current and maintaining excellence means that the future career and technical education instructor "will have to be a generalist in order to meet the fast changing needs of today's workplace" (Goldstein, Navone, & Bailey, 2000).

Model for the Virtual Teacher Training Center

A viable and functioning model for the Virtual Teacher Training Center already exists at Oregon State University in the School of Education. It is called the Professional Technical Teacher Education and Licensure Program (PTE) and is totally web-based. This program was designed and developed by Mark Merickel, and was presented to and approved by the Oregon Teacher Standards and Practices Commission (TSPC) in spring 1998 (Merickel, 1998).

The PTE program began in fall 1998, with an enrollment of 12 preservice student/teacher subject-area specialists who came out of industry and entered the program in order to gain teacher education and licensure. Five students were in Technology Education, and 7 were in Business Education. Their average age was 39, and their average experience in business and industry was 8 years; an equal number were they were male and female, and they lived throughout Oregon.

Presently, the PTE Program is in its 4th year, with 32 students; some are just beginning, and most plan to earn master's degrees. The program will have trained and licensed 18 career and technical teachers by the end of fall 2001, and instructed 7 more toward their continuing license. Six students will complete their master's degrees by fall 2003. Three practicing teachers from the first group that began in 1998 are planning to enter the doctoral program in education at Oregon State University in fall 2002. The success of the on-line PTE program makes it an excellent model upon which to base a hypothetical model for web-based teacher education and licensure in other states and within other venues.

With students who are already subject-area specialists, the PTE program focuses on training potential career and technical education teachers in the foundations of education, student and community cultures, classroom management, learning theory, curriculum development, and the pedagogy of teaching. The program also provides students with extensive opportunity for classroom practical experience and student teaching. The result is that the curriculum is a generic teacher education program that may or may not include licensure—one of the primary reasons it provides the basis for the Virtual Teacher Training Center model.

Discussion of the Model

The courses proposed for the Virtual Teacher Training Center are not templates, but examples of model courses that could be used for developing and delivering teacher education to potential career and technical education teachers. Although the program upon which the model was based was in its 4th year, it still represents a number of common issues for anyone considering implementing a web-based program. A few of these are discussed in the following paragraphs.

An underlying concern for anyone designing courses for web-based instruction is the issue of differing instructional requirements because the instructor is at a distance from the student. As one teacher states, "I could not take the face-to-face class as I taught it and put it up [on the web]. It wouldn't work" (Morihara, 1999). Also of concern is the issue of the impact of the technology

on content and student learning. Conclusions have ranged from no impact because the technology is just a delivery method and nothing more (Clark, 1983), to discussions of the effect that different media have on cognitive efficiency (Cobb, 1997).

Within web-based instruction, coursework can be scaled according to level of skill acquisition—from novice to expert—within the confines of course content. Scaling a course to fit individual learners is difficult to accomplish in a face-to-face class, but can be accomplished relatively easily in the electronic environment, where learners are working more independently. The Oregon State University course "Technology for Teachers" teaches the scaling of courses so that they range from beginner to expert and also guide the student through skill acquisition.

The courses in the model program are grouped according to the basic skills that the prospective teacher needs before becoming a full-time teacher. These courses were designed to be inquiry-based and reflective—allowing students the opportunity to synthesize knowledge from reading and research, and then to apply the results in their practicum environments.

With this approach, each student's response to activity questions and the capstone activity will be different from their peers' because of each student's unique combination of experience, thinking, and learning. Students then share their new knowledge and their experiences with their peers in an on-line discussion forum, where they post their activity responses and their discussion responses.

The courses in the model are designed around the following schema:

Students & Learning

Courses in this category address the general topic of students, their diversity, and how they learn.

- Diversity Among Students
- Interpersonal Communication
- Thinking & Problem Solving
- Learning Theory

Curriculum, Instruction, & Assessment

Courses in this category address curriculum, instruction, and assessment

- Organization & Management of the Learning Environment
- Models of Teaching, Learning, & Technology
- Assessment
- Curriculum & Instructional Design

School, Community, & Professional Cultures

Courses in this category address cultural contexts for teachers.

- Students, Families, & Communities
- School & Workplace Cultures
- School Law
- Exploring New Roles

Improving Practice

Courses in this category address improving teacher practice through reflection, systematic inquiry, and professional activism.

- Reflective Practice
- Action Research
- Leadership & the Teacher

The courses listed above are one credit each, which represents 30–33 hours of work. These courses may be re-designed and re-structured to earn more or fewer credits, depending upon whether the institution wants to offer them over a 2-year period instead of 1 year, and whether the institution is on the quarter or semester system or if the student is not connected to an educational institution.

Each course includes 3–4 open-ended activities that help students synthesize and apply their research and classroom experiences to hypothetical situations. Students post their responses into an asynchronous-thread discussion forum, an overall forum for each course, and a thread for each activity. Other students in the same class can post their responses within the appropriate thread, and also initiate new discussion threads.

Each course culminates in a capstone activity meant to be a synthesis of each student's activities in that particular course. These capstones are also posted to the asynchronous discussion forum, and all students participate in discussion about their work with instructors and peers (Merickel, 1998). All courses are designed so that additional courses may be added, appended, or interfaced—allowing student learning to be scaled upward or broadened. Students in teacher education programs with simultaneous practical experience need customizable course timing. For this reason, the overall design of the course offerings is meant to be flexible and inclusive, with the intent of increasing students' competence, regardless of each student's locus.

Within the Virtual Teacher Training Center, an extensive list of resources—including web sites, books, and journals—accompanies the instructional content. Besides the content, the activities and capstone, and the threaded discussions, the instructional site contains evaluation tools for student self-evaluation, teacher evaluation of student, an on-line grade book, an open

chat room, and a place for announcements. All of these features would not need to be used, and additional features could be added. A number of off-the-shelf instructional software programs are available to potential teachers of a virtual program such as the Virtual Teacher Training Center.

One necessary resource, which a pre-packaged instructional delivery system does not offer, is a virtual home base site for students and for program information. The Virtual Teacher Training Center provides a home base separate from the pre-packaged course delivery system. The Virtual Teacher Training Center home-base site includes:

- message center for notices relating to the program,
- information about the institution providing the program,
- information about the agency granting the potential teaching license,
- links to the institution granting transcripts of coursework,
- links to various forms required during the educational process,
- links to various student service information sites,
- links to national library databases,
- student-teacher evaluation forms for the cooperating teachers to access and complete,
- information for students regarding portfolios and work sample requirements,
- a site containing a short biography and picture of each student in the program,
- a general discussion forum where students can sit around the virtual lounge and chat

Any other information that program providers and users determine is desirable and necessary can also be included. Students come to see this site as the virtual home for themselves and their work.

Concurrent with classes, students in the Virtual Teacher Training Center would be in school classrooms near their homes, observing and working with cooperating or master teachers who will guide them throughout their practical experience and student teaching. Preservice teachers will receive their classroom experience at the same time they are taking their academic preparation, which is supervised by academic advisors. This dual learning and experience provides them with an opportunity to apply what they are learning at the time they are learning it, and to discuss their thoughts and experiences with a cooperating teacher in their physical classroom. Students also have the opportunity to discuss their experiences with fellow students in their virtual classroom in the Virtual Teacher Training Center through the asynchronous discussion forum.

Courses Within the Model

Following are detailed descriptions and content outlines for the courses in the Virtual Teacher Training Center. In addition, each of the courses has activities, a wide variety of web links and book resources, self-evaluation and student-evaluation tools, and grade reports. The following courses, once again, are examples of the types of courses that encompass the previously identified skill sets considered necessary before a trained teacher enters the classroom.

STUDENTS & LEARNING: M1—Diversity Among Students (1 credit)

Course Description

This course examines diversity among students in K–12 learning environments. Students will explore diversity and its impacts on teaching and learning, addressing issues related to:

- multiculturalism,
- linguistic backgrounds,
- racial justice, students of color,
- gender equity,
- socioeconomic status,
- students with disabilities, and
- intellectual diversity.

Specially designed activities direct the student's experience, culminating in the writing of a capstone project, which synthesizes what has been learned from reading, discussion, and classroom experience.

Course Content

- affirming the dignity and worth of all students, their families, and cultures,
- providing positive support for all learners,
- applying principles of gender equality and racial justice,
- applying principles of least-restrictive environments for students with disabilities,
- establishing and maintaining classroom rules and procedures, taking into account the influence of the physical, social, and emotional climates of students' homes and communities on motivation and behavior,

- applying organizational structures appropriate for the development levels of students, including individual and group instruction and cooperative learning groups,
- resolving conflicts in a positive manner, respecting the cultural context of the community.

STUDENTS & LEARNING: M2—Interpersonal Communication

Course Description

Interpersonal communication in the classroom involves three important issues about the teacher as a person:

- who the teacher is,
- how the teacher expresses himself or herself,
- external influences that affect personal expression.

This module guides preservice teachers through an examination of interpersonal communication in the educational environment. Special focus is placed on interactions in the classroom—examining communication with students and with others in the educational setting. External influences that affect interpersonal communication are also examined. Preservice teachers have the opportunity to reflect upon the information gained and how this information can inform their practice.

Resources will be available to aid in learning and using strategies to deal constructively, and in each person's own personal way, with interpersonal communication in the classroom. A Capstone project utilizing what has been learned and the results of personal reflections serves as the culmination of this learning experience.

Course Content

- advising students in formal and informal settings,
- interacting thoughtfully and courteously with colleagues, administrators, and parents,
- resolving conflicts in a positive manner, respecting the cultural context of the community.

STUDENTS & LEARNING: M3—Thinking & Problem Solving

Course Description

This module examines the application side of learning theory and human development, i.e., thinking and problem solving. In the process we will look at some practical applications of the various learning theories, some discussions of which is most appropriate for various subjects, and on-going research in the field of "multiple intelligences."

Course Content

- learning instructional techniques that promote critical thinking and problem solving,
- applying techniques and activities that encourage divergent as well as convergent thinking,
- Documenting an understanding of and applying knowledge of developmental psychology,
- applying strategies for learning appropriate to students in grades 5–10 and/or grades 7–12,
- examining and considering complexities of thinking and problem solving within the cultural and community context of the cooperating school districts.

STUDENTS & LEARNING: M4—Learning Theory & Human Development

Course Description

Theories of learning and human development focus on the three important perspectives in human cognitive development, which are the foundation of present-day theories:

- cognitive development as physical growth,
- cognitive development as sensory experience,
- cognitive development as schema formation.

This one-credit module discusses each of these focus areas, with an examination of the specific importance as well as the overall importance each plays in human cognition and theories of learning. Students then have the opportunity to reflect upon each of these vital areas and examine how each needs to be addressed in the practicum setting.

Students also have the opportunity to integrate this information into their own knowledge base, and experience its application in the classroom. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for their practicum environments, serve as the culmination of this learning experience.

Course Content

- determining content, skills, and processes that will assist students in accomplishing desired unit outcomes,
- designing learning activities that will lead to students' mastery,
- adapting unit and lesson plans for exceptional learners,
- applying organizational structures appropriate for the development levels of students,
- implementing instructional plans using a variety of research-based educational practices that reflect how students learn, and are sensitive to individual differences,
- understanding and ability to apply knowledge of developmental psychology and learning appropriate to all students.

CURRICULUM, INSTRUCTION, & ASSESSMENT: M1—Organization & Management of Learning Environments

Course Description

Historically, the word "management" in the classroom has referred to managing development and presentation of educational materials for students, and monitoring their learning activities. Today's classroom requires much broader skills from classroom teachers at all levels. To some educators, the word "management" as it is interpreted by many in both education and business is inappropriate in the classroom. This module explores the usage and implications of this word in the educational environment:

- what it means for the teacher as well as the student in the classroom,
- what other elements have been introduced into the modern classroom that become a part of the management task,
- what a classroom teacher needs to be prepared for from outside the classroom as well as from inside the classroom,
- what resources—environmental, administrative, and psychological—the modern-day teacher needs to have available for reinforcement.

This one-credit module will provide guidance through a discussion of each of these focus areas, with an examination of the specific, as well as the overall, importance each plays in the classroom and the educational environment for teachers, students, parents, and administrators. Students will have the opportunity to reflect upon each of these vital areas and examine how each needs to be addressed in the practicum—on each area as education and/or management.

Multimedia resources will aid in the process. Preservice teachers will have the opportunity to integrate this information into their own knowledge base, and experience its application in the classroom. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for their practicum environments, serve as the culmination of this learning experience.

Course Content

- selecting and organizing materials, equipment, and technologies needed to teach a unit of instruction,
- communicating classroom rules and behavioral expectations that provide a safe and orderly environment for learning, are appropriate to the levels of development of students, and are consistent with laws governing student rights and responsibilities,
- establishing classroom rules and procedures, applying the principles of gender equity and racial justice to all students, and applying the principles of least restrictive environment for students with disabilities,
- establishing and maintaining classroom rules and procedures, modeling appropriate social behavior, and providing meaningful reinforcement when it occurs,
- establishing and maintaining classroom rules and procedures, taking into account the influence of the physical, social, and emotional climates of students' homes and communities on motivation and behavior,
- monitoring student conduct, and taking appropriate action when misbehavior occurs,
- using classroom time effectively to provide maximum time for learning,
- managing instructional transitions decisively and without loss of instructional time,
- arranging and setting up instructional materials and equipment in advance of class to facilitate their effective use during lessons.

CURRICULUM, INSTRUCTION, & ASSESSMENT: M2—Models of Teaching, Learning, & Technology

Course Description

Models refer not only to mathematical models and simulations, but also to matrices of processes meant to represent the way students learn, whether the models are primarily behavioral, social, or developmental. This module offers the opportunity to examine models for the three primary tasks in the modern-day classroom:

- teaching,
- learning,
- technology.

Models can be a powerful tool for the classroom teacher, or they can serve as an enormous impediment. The models of teaching, learning, and technology involve a variety of purposes, usages, content, and outcomes representing complex and challenging integration requirements—intellectually, psychologically, and pedagogically. How the modern-day classroom teacher uses models in their pedagogy can stimulate, or suppress, learning.

This one-credit module will guide preservice teachers through a discussion of each of these focus areas, examining the specific, as well as the overall, importance each plays in the classroom and the educational environment for teachers, and students. Facilitating this examination will be access to multimedia resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their knowledge base, and make application to their practicum. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for the practicum, serve as the culmination of this learning experience.

Course Content

- articulating and applying a philosophy of education that is appropriate to the students in middle-level education and ensures that students learn to think critically and integrate subject matter across the disciplines,
- articulating and applying a philosophy of education appropriate to high-school students, and ensures that students learn to think critically and integrate subject matter across disciplines.

CURRICULUM, INSTRUCTION, & ASSESSMENT: M3—Assessment

Course Description

Student assessment in any historical period, at any level of education, and in any type of school or institution of learning is difficult, challenging, and fraught with subjectivities. Present-day educational consciousness is broadening to embrace diversity in all its forms, seeking the varied expressions that students use to communicate their ways of knowing and learning to their teachers. This provides teachers with a challenge unlike any experienced before.

This one-credit course will provide guidance through an examination of the many facets of this challenge. Preservice teachers will examine the specific, as well as the overall, importance assessment plays in a student's search for knowledge and direction in their educational and work lives. Facilitating this examination will be access to multimedia resources which will aid in the reflection and learning experience. Students will have the opportunity to integrate this information into their own knowledge base, and make application to their practicum. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for the practicum, serve as the culmination of this learning experience.

Course Content

- determining students' current performance levels with respect to learning goals for one unit of instruction,
- determining content, skills, and processes that will assist students in accomplishing desired unit outcomes, and designing learning activities that lead to their mastery,
- communicating learning outcomes to be achieved and focusing student interest on tasks to be accomplished,
- monitoring the engagement of students in learning activities and the progress they are making, and determining if the pace or content of instruction needs to be modified to assure that all students accomplish lesson and unit objectives,
- selecting and/or developing tests, performance measures, observation schedules, student interviews, or other formal or informal assessment procedures that are valid and reliable, and determining the progress of all students, including those from diverse cultural or ethnic backgrounds,
- documenting student progress in accomplishing state and district standards, preparing data summaries that show this progress to others, and informing students, supervisors, and parents about progress in learning,
- evaluating student progress in learning; refining plans for instruction, establishing alternative goals or environments, or making appropriate referrals—when a student's progress in learning is less than desired.

CURRICULUM, INSTRUCTION, & ASSESSMENT: M4—Curriculum & Instructional Design

Course Description

In this one-credit course, preservice teachers will learn to take both a top–down and a bottom–up approach to developing the units used in the classroom. Top–down will examine unit goals and objectives, estimating time for completion of units, and technologies required to present them. Bottom–up will explore developing individual lessons within units in such a way that each has its own unique body of information, but together they provide a unified educational experience. Surrounding this effort, students will examine, reflect, and discuss the issues of varying cultural, linguistic, and social backgrounds, and how accommodation of the issues they represent can be woven into the practice—curriculum, instruction, and assessment.

Facilitating this examination will be access to a wide variety of web-based and library resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their own knowledge base, and make application to their practice. A Capstone project utilizing what has been learned, as well as usage of mastery application skills, serve as the culmination of this learning experience.

Course Content

- selecting or writing learning goals for units of instruction that are consistent with the school's long-term curriculum goals, state and district standards, research findings on how students learn, and students' physical and mental maturity,
- establishing objectives within the unit of instruction that will be useful in formulating daily lessons and in evaluating the progress of students toward the attainment of unit goals,
- determining content, skills, and processes that will assist students in accomplishing desired unit outcomes, and designing learning activities that lead to their mastery,
- selecting and organizing materials, equipment, and technologies needed to teach a unit of instruction,
- developing unit and lesson plans that address exceptional learners, as well as students with varying cultural, social, and linguistic backgrounds,
- establishing and maintaining classroom rules and procedures, modeling appropriate social behavior, and providing meaningful reinforcement when it occurs,
- using classroom time effectively to provide maximum time for learning,
- communicating learning outcomes to be achieved and focusing student interest on tasks to be accomplished,

- implementing instruction plans and, in so doing, employing knowledge of subject matter and basic skills,
- implementing instructional plans and, in so doing, using a variety of research-based educational practices that reflect how students learn, are sensitive to individual differences and diverse cultures, and encourage parent participation,
- emphasizing instructional techniques that promote critical thinking and problem solving, and that encourage divergent as well as convergent thinking.

SCHOOL, COMMUNITY, & PROFESSIONAL CULTURES: M1—Students, Families, & Communities

Course Description

No system lives in isolation, and the educational system is no different. Even students and families that share the same culture, language, and economic status bring their own unique diversities to their activities and interactions. Students come to the classroom from their families and communities, bringing their experiences and perspectives with them. In turn, students take their experiences of their classroom culture back to their families and communities. In this continuing interplay and interaction, students, families, teachers, and communities share in the development and the commitment to the experience and education of all students.

In this one-credit course, preservice teachers will examine this interplay and the impact it has upon the classroom, its students, and their families and communities. Facilitating this examination will be access to multimedia resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their own knowledge base, and make application to the classroom. A Capstone project utilizing what has been learned, as well as usage of mastery application skills, serve as the culmination of this learning experience.

Course Content

- collaborating with parents, colleagues, and members of the community to provide internal and external assistance to students, and their families if needed, to promote student learning,
- interacting constructively with colleagues, administrators, supervisors, and educational assistants and parents,
- applying organizational structures appropriate for the development levels of students, including individual and group instruction and cooperative learning groups.

SCHOOL, COMMUNITY, & PROFESSIONAL CULTURES: M2—School & Workplace Cultures

Course Description

Programs such as CAM and CIM, School-to-Work, Goals 2000, Tech-Prep, etc., are focusing the attention of teachers, students, business leaders, politicians, parents, and community leaders on the special relationship between school and the workplace:

- their complementary and contradictory processes,
- their complementary and contradictory goals,
- their view of the future for education and how that future will be realized,
- their view of workforce development, and how that will affect continued personal growth.

In this one-credit course preservice teachers will examine the above issues—particularly from the school culture and workplace perspectives—reflecting on them, and engaging in dialogue with others regarding their conclusions. Facilitating this examination will be access to multimedia resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their knowledge base, and make application to the classroom. A Capstone project utilizing what has been learned, as well as usage of mastery application skills, serve as the culmination of this learning experience.

Course Content

- practicing dependability, conscientiousness, and punctuality,
- meeting work-schedule demands,
- exhibiting awareness of the importance of dressing appropriately in professional environments,
- being aware of, and acting in accordance with, school policies and practices,
- respecting cultural patterns and those expectations that operate within school,
- functioning as a member of an interdisciplinary team to achieve long-term curriculum goals, and state and district standards,
- participating in educationally relevant issues outside the immediate classroom—including educational reform, integration of school and the world of work, CIM and CAM, and collaboration of school and community.

SCHOOL, COMMUNITY, & PROFESSIONAL CULTURES: M3—School Law

Course Description

The passage of the Civil Rights Act (1964), followed by legislation addressing the special needs and interests of students such as Title IX (1972), have had a tremendous impact on education. More recently, passage of state and federal initiatives relative to educational reform and performance assessments for students and teachers have added to the maze of legislation. The legislation has addressed educational licensure, practicum, and assessment of the efficacy of the educational system to prepare students for lifelong learning as well as to prepare them for a work life of transformational learning. These laws and initiatives provide educators with the power to redress or enforce educationally democratic practices and assessments. This one-credit module will lead students through a discussion of some of these issues.

Facilitating this examination will be links to resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their knowledge base, and make application to the practicum. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for the practicum, serve as the culmination of this learning experience.

Course Content

Law is one area that most professional educators choose not to deal with. However, a myriad of laws enacted over the past 20 years directly affect teachers in their classrooms. Some of these laws require increased accessibility, such as the Americans with Disabilities Act. Some laws relate to the future direction of education, such as Goals 2000. Others relate to the safety of students and teachers while on school grounds.

Most teachers, willingly or unwillingly, have had reason to review, discuss, become knowledgeable about, or deal directly with law of some type—whether administrative, criminal, local, or federal.

SCHOOL, COMMUNITY, & PROFESSIONAL CULTURES: M4—Exploring New Roles

Course Description

As education moves into the 21st century, teachers working at all education levels have been taking on roles that once were only a minimal, or no, part of their knowledge base. These roles include social advocate, counselor, classroom manager, cultural coordinator, and action researcher. Other roles teachers are assuming outside the classroom are political activist and supporter of all. Additionally, teachers need to continue their own professional development through new experiences, interaction with others, and education. In this one-credit module students will examine a number of these roles and reflect upon their importance to and impact upon their personal life, the life roles they wish to or are pushed to assume, and how they feel about them.

Facilitating this examination will be access to multimedia resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their knowledge base, and make application to the practicum. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for the practicum, serve as the culmination of this learning experience.

Course Content

- collaborating with parents, colleagues, and members of the community to provide internal and external assistance to students, and their families if needed, to promote student learning,
- meeting work-schedule demands,
- being aware of, and acting in accordance with, school policies and practices,
- respecting cultural patterns and expectations that operate within a school,
- interacting constructively with colleagues, administrators, supervisors, educational assistants, and parents,
- advising students in formal and informal settings,
- functioning as a member of an interdisciplinary term to achieve long-term curriculum goals, and state and district standards,
- exhibiting energy, drive, and determination to make one's school and classroom the best possible environment for teaching and learning,
- exhibiting energy, drive, and determination to become a professional educator,
- becoming familiar with relevant public laws:
  - Public Law No. 64-347 (Smith–Hughes Act of 1917),
  - part of Public Law No. 88-210 (Vocational Education Act of 1963),
  - Public Law No. 101-392 (Carl D. Perkins Vocational and Applied Technology Education Act),
  - Public Law No. 97-300 (Job Training Partnership Act),
  - Public Law No. 102-367 (Job Training Reform Amendments of 1992),
  - Public Law No. 103-239 (School-to-Work Opportunity Act of 1994).

IMPROVING PRACTICE: M1—Reflective Practice

Course Description

Reflective practice actually relates to a teacher's knowledge of themselves as a person, their reflection on their own behavior, and their application of the results of those reflections to their own practice. Achieving a truly reflective practice is a skill that can be learned, but it requires attention, self-knowledge, and constant usage. Professional reflectivity aids in re-orienting cognitive, behavioral, and affective responses to the contextual demands of teaching.

This one-credit module will introduce students to a personal intercommunication analytical tool—the Keirsey Temperament Sorter II—which will provide some powerful insights into personal thought processes and resulting behaviors. Then opportunity is provided for reflection upon the self-knowledge gained and how this knowledge can inform their practice.

Facilitating this examination will be access to multimedia resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their knowledge base, and make application to the practicum. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for the practicum, serve as the culmination of this learning experience.

Course Content

- assembling, reflecting upon, interpreting, and communicating evidence of one's own effectiveness as a teacher, including evidence of success in fostering student progress in learning,
- if unsuccessful in fostering student learning, identifying, analyzing, and interpreting causes, and determining what the teacher should do differently if a similar unit were taught again.

IMPROVING PRACTICE: M2—Action Research

Course Description

The scientific, mathematical, and behavioral quantitative research methods and the ethnographical, sociological, and historical qualitative research methods have been at odds within the field of education for at least the past 40 years. Out of this conflict, action research is emerging as a process for developing new knowledge and solving problems. One of the primary reasons is that most teachers don't have the time or interest to use the rigorous research of either of the other types. What practicing educators do have time for, since they are already spending their professional lives there, is the examination of the issues and problems arising from, and requiring solution within, their own practicum. This, then, is the laboratory for the teacher/action-researcher.

In this one-credit module, students will determine what action research means to the practicing teacher, and to the research techniques that can be adopted and used with the types of problems to be explored and examined. Facilitating this examination will be access to

multimedia resources that will aid in student reflections and learning experiences. Students will also have the opportunity to integrate this information into their own knowledge base, and make application to their practicum. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for the practicum, serve as the culmination of this learning experience.

Course Content

- monitoring the engagement of students in learning activities, and the progress they are making, to determine if the pace or content of instruction needs to be modified to assure that all students accomplish lesson and unit objectives,
- selecting and/or developing tests, performance measures, observation schedules, student interviews, or other formal or informal assessment procedures that are valid and reliable to determine the progress of all students, including those from diverse cultural or ethnic backgrounds,
- documenting student progress in accomplishing state and district standards, preparing data summaries that show this progress to others, and informing students, supervisors, and parents about progress in learning,
- assembling, reflecting upon, interpreting, and communicating evidence of one's own effectiveness as a teacher, including evidence of success in fostering student progress in learning,
- if unsuccessful in fostering student learning, identifying, analyzing, and interpreting the causes, and determining what the teacher should do differently if a similar unit were taught again.

IMPROVING PRACTICE: M3—Leadership & the Teacher

Course Description

Leadership for the teacher does not necessarily mean external, national, or professional leadership. It also means an internal leadership of the self that is expressed in the day-to-day interactions in the classroom between teacher and student, teacher and parent, and teacher and administrator. It is this leadership that inspires students to achieve more, to bring credit to their teachers, and to look back at their educational experiences as some of the most crucially defining moments of their lives.

In this one-credit module, students will examine what it means to be a teacher-leader from both perspectives—from the external leadership model, and from the internal leadership model. Facilitating this examination will be access to multimedia resources that will aid in reflection and the learning experience. Students will have the opportunity to integrate this information into their knowledge base, and make application to the practicum. A Capstone project utilizing what has been learned, as well as usage of mastery application skills for the practicum, serve as the culmination of this learning experience.

Course Content

- mentoring colleagues,
- applying an understanding of organizational behavior and institutional change,
- affirming the dignity and worth of all students and providing the positive support,
- interacting constructively with colleagues, administrators, supervisors, educational assistants, and parents,
- functioning as a member of an interdisciplinary team to achieve long-term curriculum goals, and state and district standards,
- exhibiting energy, drive, and determination to make one's school and classroom the best possible environment for teaching and learning.

TECHNOLOGY FOR TEACHERS

A series of one-credit courses scaled so that current or potential teachers may choose which courses they need to take based on their knowledge and skill level. These courses are not meant to provide aspiring technology teachers sufficient information to teach these courses. Rather these courses are designed to aid teachers in gaining exposure to technology that they can use for managing their own instruction and creating various classroom materials. These courses are also scaled so that teachers can select from beginning-level interaction using computers to more advanced interactions involving reflective work in the philosophy of technology and learning.

M1—Internet & Web Tools

- examining the world of the Information Super Highway and what it has to offer teachers and trainers,
- exploring the world of the Internet, web, and web browsers, and learning to use various teaching and learning support echnologies, such as electronic mail (E-mail), discussion/news groups and message boards, and web browsers such as Netscape® and Microsoft® Internet Explorer,
- integrating and using library resources with Internet resources for study and research.

M2—Web Page Design Issues: Images & Color

- examining the issues of accessibility in web page design, and discussing strategies and solutions available in this technological environment,
- exploring use of color, hue, intensity, etc. and the physiological processing of color,
- exploring the psychological effects of color separate from, and in conjunction with, content,

- examining the issues involved in embedding objects, static or moving, within web pages designed for learning,
- exploring various visual processing anomalies and the related implications for designing computer-generated images and writing text text.

M3—Web Page Development: Personal & Professional

- examining differences in objectives between personal and professional web pages,
- exploring several web page development tools and discussing usages,
- using web-page development tool to create web pages,
- publishing web pages.

M4—Microsoft PowerPoint® for Classroom Presentation & for Training

- exploring the uses of PowerPoint for teaching or training,
- coordinating the features of PowerPoint with other technologies,
- examining the special features available to expedite creation of presentation,
- transformational exploration in learning to migrate images and slides between presentations,
- examining the impact of visual presentation in a learning or training environment.

M5—Application of Technology & Integration of Internet & Web Tools for Teaching and Training

- identifying by student of task for student's learning/training environment,
- designing and developing task using development tools,
- self-evaluating efficacy of tool to target market,
- completing several tasks using various software tools; Internet, Web, PowerPoint, etc.

M6—Philosophy of Technology & Learning

- studying the knowledge base of learning, memory, and cognition,
- examining theories of information processing embedded in learning theories,
- examining theories of learning as affecting information processing theories,
- critically discussing the significance of this circular theory development,

- studying the resulting epistemology of technology and how it is applied to learning,
- critically examining the impact of technology-based pedagogy on stress-levels in students and teachers,
- discussing a technology-based future: limits and opportunities.

M7—Microsoft Windows® for Teachers & Trainers

- introducing Windows® technology and usage,
- examining and using tools for finding, moving, and copying files,
- exploring and utilizing the Bookmark feature,
- utilizing various utility options, and changing desktop features and preferences.

M8—Word Processing for Teachers & Trainers

- introducing word processing software and usage,
- learning creation, formatting, and saving of a document,
- exploring and completing retrieval and editing of document,
- examining printing options and ways to make changes,
- creating documents and embedding spreadsheets, graphics, and mailing lists.

Translation of Courses into Programs

The Virtual Teacher Training Center program proposes a one-year program of study (Figure 2) using web-delivered instruction. Such a program could provide potential CTE teachers with academic opportunities to synthesize their work-based experience with knowledge of education and its pedagogy. The virtual center could also reach populations who for reasons of economy, time, or distance have not enrolled in traditional teacher preparation programs.

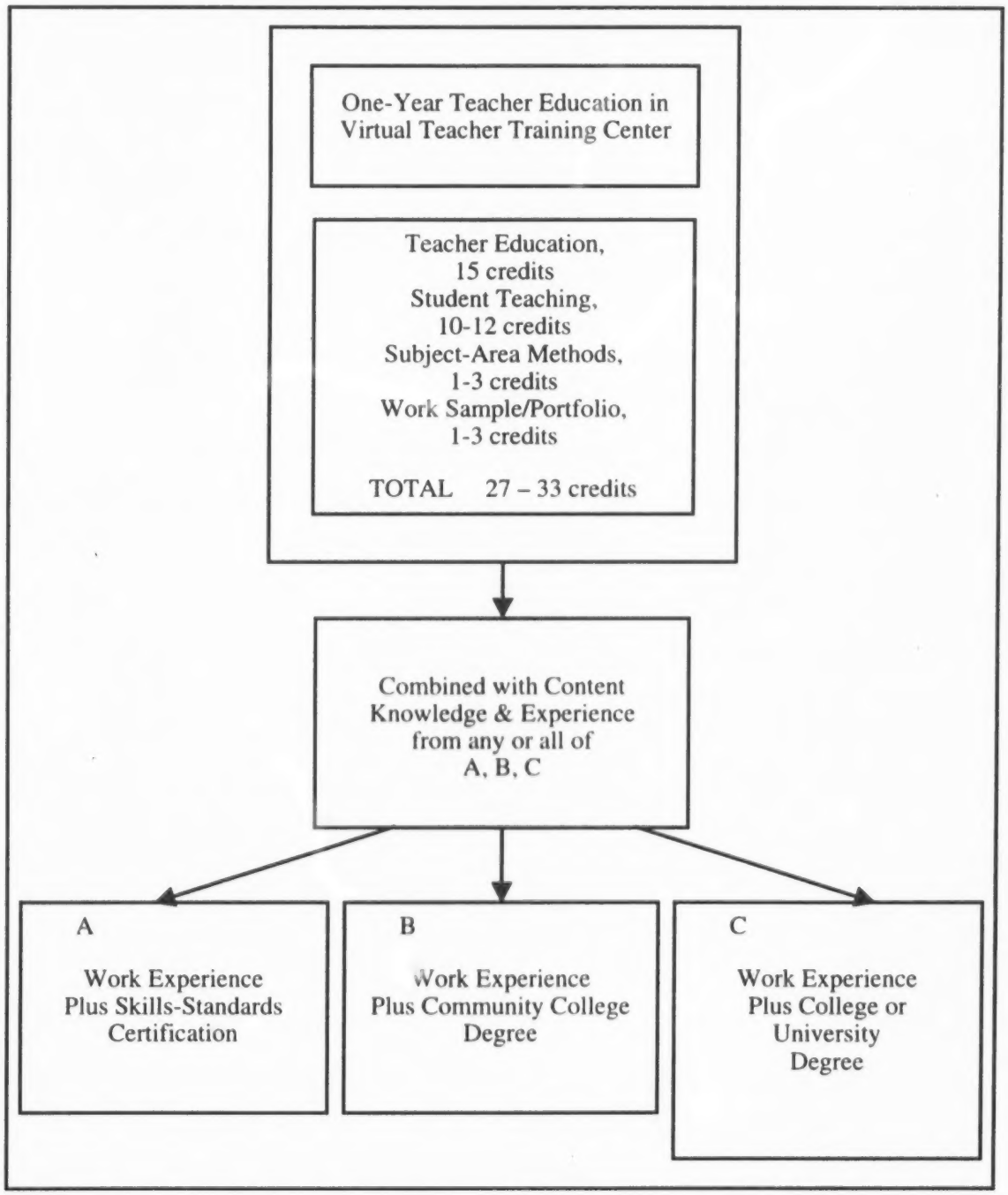
One-Year Teacher Education in Virtual Teacher Training Center
Teacher Education, 15 credits
Student Teaching, 10-12 credits
Subject-Area Methods, 1-3 credits
Work Sample/Portfolio, 1-3 credits
TOTAL 27 – 33 credits
Combined with Content Knowledge & Experience from any or all of A, B, C
A
Work Experience Plus Skills-Standards Certification
B
Work Experience Plus Community College Degree
C
Work Experience Plus College or University Degree

Figure 2. Virtual Teacher Training Center one-year CTE teacher education program using web-delivered instruction.

The proposed configuration would take 1 calendar year—at which point the newly trained career and technical education teacher would be eligible for an initial teaching license. One of the important features of the Virtual Teacher Training Center is that it could be utilized in conjunction with: work experience alone, 2 years of community college career or vocational training, or a 4-year bachelor's degree in a career and technical content area. As proposed, the program includes 27–33 credits, including academic work, practical experience in the classroom, student teaching, subject-area methods courses, and a course in work samples/portfolio.

Flexibility in Course Offerings and Delivery

An example one-year teacher education program in a Virtual Training Center is presented in Figure 3. The courses in the program are based upon quarter credits, each of which requires 30 –33 hours of work.

Credits may be variable, depending upon implementation; 1 credit = 30—33 hours		
#1	1cr	Diversity Among Students
#2	1cr	Interpersonal Communication
#3	1cr	Thinking & Problem Solving
#4	1cr	Learning Theory & Human Development
#5	1cr	Organization & Management of Learning Environments
#6	1cr	Models of Teaching, Learning, & Technology
#7	1cr	Assessment
#8	1cr	Curriculum & Instructional Design
#9	1cr	Students, Families, & Communities
#10	1cr	School & Workplace Cultures
#11	1cr	School Law
#12	1cr	Exploring New Roles
#13	1cr	Reflective Practice
#14	1cr	Action Research
#15	1cr	Leadership & the Teacher
Practical Experience	0	No credit; practical experience observing in classroom and with master or cooperating teacher in preparation for student teaching
Methods of Teaching	1—3 credits	Methods for teaching specific practical hands-on subject areas such as web access, keyboarding, woodworking, autoshop, computer usage, etc.
Work Samples & Portfolio	1—3 credits	Work samples and portfolio reflecting academic and student teaching
Student Teaching	10—12 credits	Student teaching under supervision of master teacher or cooperating teacher
Total Credits:	27—33 variable, depending upon implementation of program	

Figure 3. An example of a one-year teacher education program in a Virtual Teacher Training Center.

The sample program includes 15 one-credit courses for preservice teacher training, 10–12 credits of student teaching, 1–3 credits of subject-area methods of teaching, and 1–3 credits of work sample/portfolio.

Each of the following two possible configurations are meant to be completed within 1 academic year of full-time work (Figure 4 and Figure 5).

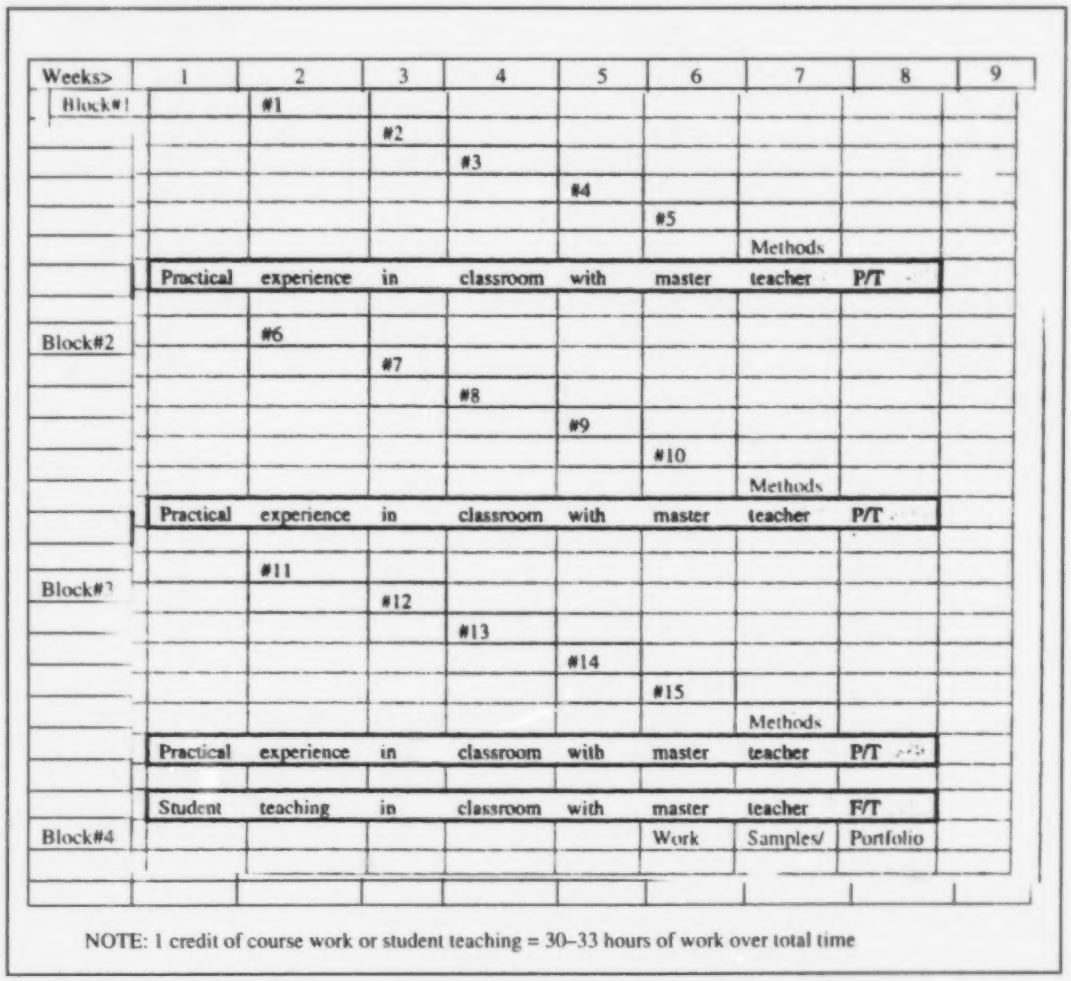

Figure 4. Possible configuration for example of varied scheduling possibilities—full-time program based on four 8-week blocks (adjustable for longer or shorter time).

The courses outlined in Figure 4 is completed in 32 weeks, at which time the new career and technical education teacher has the full basic background training of teaching pedagogy, development of work samples, and extensive practical experience. At this point, the new teacher is ready to be licensed according to the requirements of the state licensing agency.

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The courses outlined in Figure 5 is completed in three 11-week full-time blocks, and the new career and technical education teacher would be educated, experienced, and ready to be licensed for entry into the classroom. In both figures, all of the time during the last block would be spent completing the subject-area methods work and work samples/portfolios, as the program requires. Concurrently, students would be doing their student teaching.

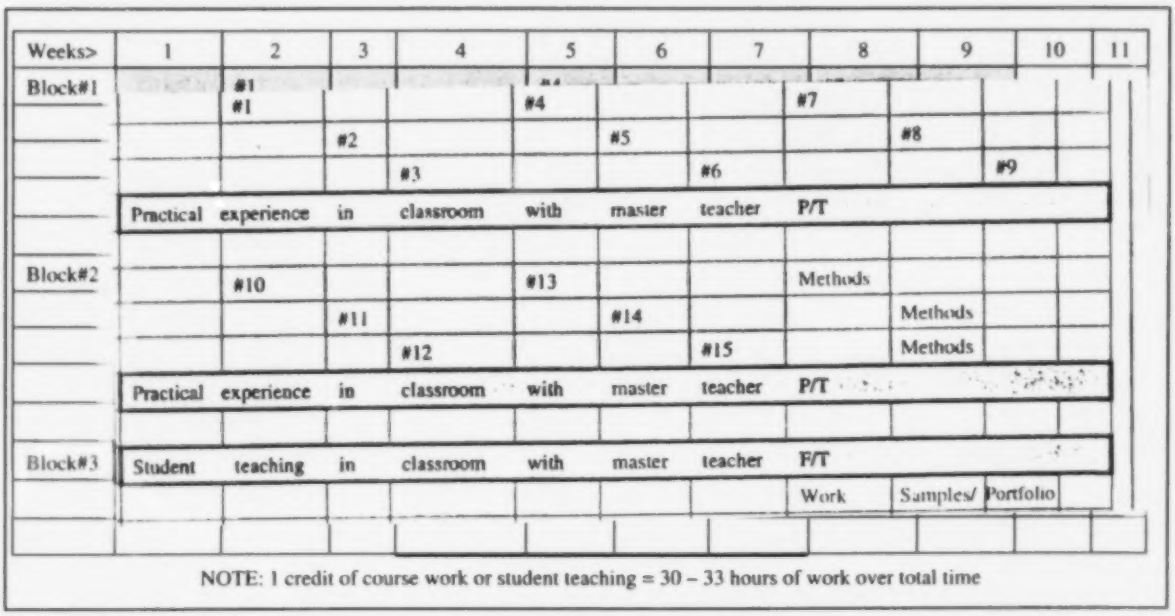

Figure 5. Possible configuration for example of varied scheduling possibilities—full-time program based on three 11-week blocks (adjustable for longer or shorter time).

Concurrently with coursework, students would be in the remote classroom part-time, gaining practical experience. Practical experience, in many cases, is not for credit. In this example, it is not; nor is it included in the 30 credits of work identified in the program. Requiring uncredited practical experience is a common practice in education, and can be looked upon as a lab experience for potential teachers. It is suggested that institutions adopting such a program collaborate with local school districts—asking the district to provide this practical experience for students as part of providing the master or cooperating teacher's time. However, the student teaching, which is full-time, is taken for credit; these credits are included in the program and would be transcripted.

Figures 4 and 5 are examples of the flexibility that the Virtual Teacher Training Center could offer. Their major strengths are:

- one-credit courses encompassing the basic knowledge that entry-level teachers require,
- independence from the traditional college/university semester or quarter system for time blocks,

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- independence from the traditional college/university system of prerequisite courses for a bachelor's-level liberal arts degree,
- closer collaboration with cooperating faculty in the local schools,
- longer practical experience in the classroom,
- dependence upon previously acquired subject-area knowledge from work and/or trade experience.

It must be noted that the above suggestions and Figures 4 and 5 do not preclude a liberal arts education. What they do is remove it as a prerequisite to the teacher education program offered in the Virtual Teacher Training Center. New teachers may continue study toward a degree, or degrees, after entering the classroom to teach. The courses offered in the Virtual Teacher Training Center should carry course-credit with them, which new teachers can transfer into other degree programs. It is also recommended that student teachers completing this one-year program receive a certificate of completion, and that the courses shown on this certificate are also on a transcript.

Evaluation and Assessment

Not only is the design of a course for a web-based environment different from those for a face-to-face environment, but the evaluation tools must also be different. To quote the *American Journal of Distance Education*, "In distance education, because the learner is separated from the instructor, and the instructor is separated from the administering agency, success of the whole enterprise is dependent on an effective monitoring and evaluation system" (Moore, 1999).

In a web-based environment, most evidence of learning is presented by students in written form. Therefore, the preparation of the student to produce quality written work is crucial—which has led many universities to re-institute courses in basic writing and literacy skills for their graduate-level teacher candidates. In the web-based environment, portfolios have taken on a new role as a primary evaluative tool for both new teachers and for teachers working toward their continuing licensure.

Virtual Supervision

In many states, supervision of preservice teachers is the responsibility of the program coordinators. In others, supervision is part of a separate unit involved only with supervision and advising, not with teaching classes to preservice teachers. The issue in a web-based program is that the students and their teachers who would also be doing the supervision are separated by some considerable distance. This leaves the program coordinator or other designated supervision person from the entity delivering the education program to go some distance to the student's school site to supervise. Another possibility is using a supervising contractor, who may be a retired teacher. Or, this responsibility may fall to someone who works for the school district who normally performs that function.

All of these options are of limited effectiveness in supervising student teachers at a distance. Distances may be too long for supervision to be done by the program coordinator or university

supervisor. Relying on others to do the supervision leaves a gap in knowledge for the institution delivering the program—a critical gap in verifying that the new teachers they are producing have gained the skills the program requires. Nor does the remote arrangement provide the licensing agency with assurance that the program they approved is confirming that the student seeking licensure has acquired the required skills.

The Virtual Teacher Training Center would develop a process and protocol for on-line supervision using multimedia tools. This type of supervision must deal with a number of factors:

- a designed and approved process for performing virtual supervision,
- an elaborated protocol for the technology required to accomplish this feat,
- capability from the institution to provide a variety of technologies for virtual supervision with a variety of schools that also have a variety of technologies,
- capability from the classroom to provide at least one technology to participate in virtual supervision,
- maintenance of a source of traditional supervision, should a school not have the technology for virtual supervision, or should parents object,
- establishment of guidelines regarding the legal issues surrounding the capture and transmission of students' images, personal information, and class records to a remote site,
- storage and archival of tapes, videos, etc., with student and student teacher images and information.

When one considers the issues involved in virtual supervision, the first instinct might be to abandon the idea as too complex. However, with virtual delivery of instruction will need to be accompanied by virtual support of students at a distance with services from the delivering institutions—such as registrar, admissions, and transcripts. And virtual instruction will also require virtual supervision.

Discussion as a Learning Tool in a Virtual Environment

Any discussion about offering virtual programs must address whether such a delivery method provides learning for students. Since students and teachers are at a distance from each other, the primary method used for learning in a web-based environment is the discussion that occurs between and among the teachers and the students in the virtual classroom. This fact is often overlooked—especially by students.

Discussion in a virtual environment, whether it is synchronous (in real time, similar to a face-to-face conversation) or asynchronous (delayed interaction, similar to a letter) is thought of almost solely as a means of communication, and not as a means of learning. And most people, who have been educated in traditional classroom settings, believe that real communication does not occur unless both people are in the same physical space and can see each other. There is nothing in the definition of communication that requires physical proximity. The definition states

that "communication is a process by which information is exchanged through a common systems of symbols" (Webster, 1996).

Everyone knows, intuitively, that there is more to communication than just words. Facial expression and body language, sense of presence of another human, audial sounds of words and meanings from language, visual cues, and even smells are all synthesized into each moment of communication. Everything in the environment comes into play. In a web-based environment, the same is true, except communication encompasses different experiences.

Although web expertise can be a powerful tool, resistance to learning it challenges what many people believe about communication and learning. These basic beliefs have become embedded in what we consider necessary for students to learn and teachers to teach. Experienced instructors of web-based classes accommodate the loss of the face-to-face experience in their desire to reach students who cannot, for some reason, physically come to the campus. Students also accommodate the loss of face-to-face communication, in their desire or necessity to have on-line access to learning and information at their home site. Few seriously consider on-line communication as a desirable, even sought-after method of communication.

Almost universally, teachers and students who have had positive experiences with web-based instruction, when asked about their preference, almost invariably choose in-class instruction (Mezirow, 1994). The reason they give for this choice is the need for physical proximity in order to communicate face-to-face. If web-based instruction is to gain acceptance as a method of instructional delivery for teachers, learning environments, and students of all types, this prejudice must be examined and overcome—otherwise a dissonant dynamic is set up for both teachers and learners.

Dissonance is inconsistency between one's beliefs and one's actions (Festinger, 1957). In a web-based environment, dissonance exists between students' expressions of beliefs about communication and what they believe is necessary for learning to occur. At the same time, they are communicating and learning in an environment that provides none of the elements they consider necessary; i.e., communicating face-to-face and learning via discussion, whether synchronous or asynchronous (Fischer, 1996).

This dissonance is an impediment to learning because it can be expressed as resistance to participation in the discussion necessary for learning, and in the usage of E-mail as a way to accomplish the one-on-one relationship with the instructors that the students also feel is necessary for learning to take place. While studies show that many students in a traditional classroom environment never approach the instructor, nor do they establish a one-on-one relationship with either the instructor or their peers—nonetheless, they continue to believe that it is necessary (Hill & Hannafin, 1997).

Students and teachers alike say that seeing and sensing the other person in the same space is verification of their realness; i.e., a form of authentication. It appears that in the face-to-face classroom, the physical presence of the teachers and students is connected more to providing a comfort level of nearness than it is to fulfilling a requirement of learning.

The belief that simulated closeness with the instructor via E-mail is a real closeness to the source of learning is, in reality, not accurate. That interface is not where knowledge is being developed nor where learning is actually taking place (Simon, 1996). In a web-based environment, knowledge development and learning takes place in the discussion groups. This is where students are able to reflect on their research and course content, and formulate their thoughts into words, which other students then read and respond to. This opportunity for discussion, refinement of thinking, and expression of ideas, is the most important site of learning in web-based instruction—all too often disrespected or taken for granted (Reeves & Reeves, 1997).

Web-based instruction is challenging us to examine our beliefs and expand our capacity for communication for the dual purposes of establishing a productive relationship and for learning in a virtual environment. The asynchronous-thread discussion format provides teachers and learners in a web-based environment the opportunity and the mechanism to accomplish both (Mezirow, 1994). And, it is these relationships that support the learning and sense of trust that students require within relationships with unseen others in order to express their thoughts and reflections—thoughts they might not feel as comfortable to express within the traditional classroom, with all of its power differentials (Klein & Schnakenbert, 1999).

CONCLUSION

Looking Forward

In order to look forward with action, we also need to re-think our traditional beliefs about what it takes to train teachers—beliefs that hold us back from applying new ideas and new technologies toward solving the problems related to teacher education and licensure. These beliefs are also blinding us to new ideas about status, professionalism, training and licensure methods, and career and/or degree paths evolving from a teacher's entry point into the profession.

To move ourselves forward, we need to seriously consider:

- new sources of potential teachers for career and technical education,
- new methods of delivering teacher education, relying on newer technologies such as web-based instruction,
- shorter interim teacher education and licensure programs that could be completed within 1 academic year or less,
- introduction of shorter training programs not tied to lengthy degree programs,
- development of horizontal career paths that would move non-degreed but professionally licensed teachers from initial licenses into and through degree-granting programs.
- development of a vertical career path, progressing from novice teacher to expert teacher much as the trades progress from apprentice to journeyman to master.

Obviously, serious consideration of these issues and accommodation to the needs that result must be accompanied by several major perspective changes: at the professional and community-college levels to provide additional basic skills work; at the college and university level for allowance of 1-year alternative teacher education and/or licensure certificate programs to exist side-by-side with extended teacher education degree programs; at the state and national levels for policy changes regarding teacher education and licensure, and allowance for alternative sources of courses and programs that satisfy these goals.

Continuing Training and Licensure

Many experienced educators agree that teachers do not have to learn everything before they begin teaching (Lucas, 1999). Experienced teachers know from their own experiences as educators that new teachers know a whole lot more after the first year of teaching than they knew before the first year—even if they had extensive in-class student teaching experiences. However, most education programs train the new teacher as though they will having nothing left to learn at some future date. The reality is that more and more school districts are requiring teachers to earn continuing professional development credits in order to remain current in their practice. To remain current, practicing teachers need to refresh their professional skills regularly—and they need to receive economical encouragement to do so, rather than punishment for not doing so.

Use of Technology to Broaden Access

Technology carries the capability to broaden access to education—if it is incorporated within curriculum and programs, and if it is utilized regularly by classroom teachers as part of their teaching materials and teaching strategies. For career and technical education teachers, the use of technology is often naturally embedded in the subject areas they are teaching. However, the melding of technology methods with subject-matter content should be a concerted effort; well-thought-out-and -executed. Otherwise, the result will be haphazard or will diminish the value of the lesson presented. Following are some suggestions for inclusion of multimedia and technology within class content and materials. The Virtual Teacher Training Center lends itself naturally to this inclusion, and can provide a number of additional services, facilitations for distant students, and resources:

- multimedia inclusion and support at every level as an integral part of reinforcing and enhancing the content, pedagogy, and delivery of every course in every program;
- capitalization on the special feature of web-based technology to expand the opportunities for learning to audiences interested in education in non-traditional ways;
- multi-layered licensure designs—horizontally including transitional, preservice, and continuing licensure, and vertically including licensure-only, licensure and masters combined, and masters-only, as well as inclusion of undergraduate and non-academic work;
- collaboration with on-campus services (registrar's office, admissions, and graduate school) for acceptance of academic work leading to licensure from non-traditional sources (University of Phoenix, private sources, etc.), credit for life and cultural experience (such as teaching native languages on a reservation);
- acceptance of non-traditional knowledge production (web-based courses and programs, computer graphics, films, performances, dance, music) as satisfying research and academic requirements for licensure and advanced degrees;
- electronic-learning collaboration agreement between and among universities offering educational training and/or licensure, so that students from any state may take courses from any other state and have them transcripted by their home university—expanding students' options for building credits toward licensure or a degree within the state where they reside;
- collaboration among universities, community colleges, and professional organizations on the development of content methodology, resulting in product availability to all collaborators; products may be used as required or elective offerings within the home universities' programs;
- combined program, electronically controlled, as a combination in-class and electronically delivered series of courses that combine university, professional, and community college courses to satisfy the training of the next generation of technology education teachers;

- combined program for continuing licensure that accepts, from a variety of traditional and non-traditional sources, credits that lead to continuing licensure and an advanced degree (if desired);

- high-intensity focus on non-duplication of effort and greater utilization of various on-campus and on-line courses across programs and disciplines, where course content is so similar that various programs and disciplines could use the same courses;

- where no bachelor's programs exist in the individual subject area (technology), acceptance of coursework done at community-college level into degree programs. Otherwise, no potential technical education teachers will be produced capable of being licensed through graduate level programs except for those whose sole content knowledge is derived from industry experience, which has proven to be insufficient;

- options via electronic and distance educational media to prepare prospective teachers without bachelor's degrees in programs that combine education and subject-matter content, plus final internship, toward achievement of the bachelor's degree and licensure in 4+ or 5 years;

- web-based training from a central Oregon State University site for remote on-site local teachers in mentoring and supervision;

- web-based discussion, chat room, and instruction between Oregon State University faculty/supervisors and remote on-site local mentor/supervisors;

- development of a directory on one of the servers where a cadre of general information web pages could reside that are accessible by more than one program, instructor, or course. The utility of this approach would be to: broaden availability of internal pages for linking, reduce duplication of effort, broaden the knowledge base in all courses, and reduce the manpower and time required to maintain individual and separate web pages that cover basically the same or related information.

A number of these potential services, of necessity, will require a fresh perspective and a change in many of the beliefs predominantly held about teaching in a university setting: terms, grades, transcripts, course delivery, prior coursework acceptance, life experience, what constitutes intelligent behavior, etc.

A Change in Perspective

We have, wittingly or unwittingly, made teacher education more academic than it needs to be to place trained and competent teachers in the classroom. It would be impossible to determine in any substantive way whether we have done this in the belief that the more education a teacher has, the better teacher they will be, or whether it is because educators themselves still long for professional status in universities where practitioners in academic subjects still seem to consider teachers to be vocational practitioners.

However, many problems in the education of teachers result from two missing, fundamental, and unprovable pieces of knowledge. These are: the ways students learn, and what makes a good

teacher. Even with modern-day research in brain processing, the actual learning process still eludes us; i.e., how is sensory perception processed cognitively, combined with disparate other knowledge, or compared with existing knowledge, to become new knowledge? (Crick, 1994; Gazzaniga, 1988, 1992; Minsky, 1986; Penrose, 1989; Restak, 1984; Rumelhart, 1975). The Virtual Teacher Training Center allows us to focus on a pragmatic solution to helping resolve our current teacher shortage by providing career and technical teachers what they need to know based upon their subject areas using what we know about students' learning.

The Virtual Teacher Training Center concept also opens some thought-provoking questions:

- Are traditional ways of training students and teachers so much better than new ways that we are willing to reject new technologies' huge potential for broader delivery of instruction?
- Does more heavily weighted academic study provide specific information to enable career and technical education teachers to be as effective in their classrooms as they would be from an alternative method of training which focused more heavily on workplace skill-related tasks and practical classroom application?

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